

REMARKS

Favorable reconsideration and allowance of this application are requested.

1. Discussion of Amendments

By way of the amendment instructions above, several obvious typographical errors have been corrected in the specification as originally filed.

In order to clarify characteristics of the present invention and differences between the present invention and the cited references, recitations to an antioxidant, a heat stabilizer and a processing stabilizer have been incorporated into claim 1 as essential components for the composition, based on claims 6-9 and the Examples 2-25.

Moreover, the basic nitrogen-containing compound among the heat stabilizers has been further specified to the following compound for the purpose of distinguishing from the hydrazide of the formula (1), based on the paragraphs [0076] and [0085]:

"at least one member selected from the group consisting of an aminotriazine compound, a guanidine compound, a urea compound, an amino acid compound, an amino alcohol compound, an imide compound, an amide compound, and a hydrazine compound different from the carboxylic acid hydrazide represented by the formula (1)"

It will be further noted in this regard, that an "organic carboxylic acid" has been omitted from the claimed choices of the heat stabilizer so as to distinguish the heat stabilizer from the processing stabilizer.

Claims 17-19 have been amended so as to conform to the amended version of claim 1 and thereby preserve the applicants' right to rejoinder upon allowance of the elected claims.

2. Response to 35 USC §103(a) Rejection

(1) Examiner's position

The Examiner asserts that claims 1, 3 and 5-16 are obvious (35 USC §103(a)) over EP 0333660 in view of Haruna et al (USP 4,894,400).

(2) Cited references

(i) EP 0 333 660

EP 0 333 660 discloses an acetal homo- or copolymer which comprises (a) a hindered phenol corresponding to the formula I, II, III, IV, V, VI or VII ...; and (b) a hydrazine compound corresponding to the formula VIII, IX or X... ; or (c) an oxamido compound of the formula XI ... ; the weight ratio of the components (a):(b) or (a):(c) is 20:1 to 1:10 (claim 1).

EP 0 333 660 also discloses that the blends may be employed in from about 0.01 to about 10% by weight of the stabilized composition (page 7, lines 14-16).

Regarding additives, EP 0 333 660 discloses the following:

"The resulting stabilized polymer compositions of the invention may optionally also contain various conventional additives. Included among these additives are basic co-stabilizers such as calcium citrate, melamine, cyanoguanidine, polyamides, alkali and alkaline earth metal salts of high fatty acids, and amines; phosphites and phosphonites; peroxide-destroying compounds such as esters of thiodipropionic acid; and the like" (page 7, lines 23-27).

Regarding the effects of the disclosure subject matter, EP 0333660 discloses as follows:

"The instant invention also relates to a method of stabilizing an acetal homo- or copolymer against thermal or oxidative degradation ... a method of reducing color formation in acetal homo- or copolymers containing a hindered phenol (component (a))" (page 7, lines 28-33)..

(ii) Haruna: USP 4,894,400

Haruna discloses a synthetic polymer composition which comprises 100 parts by weight of a synthetic polymer and 0.001 to S parts by weight of at least one of benzotriazole compounds represented by the formulae (I), (II) and (III) (claim 1).

Haruna also discloses polyacetal as the synthetic polymer together with other numerous polymers (claim 2). According to the Examples of Haruna, LDPE, PP or ABS is used as the synthetic polymer.

Regarding the effects of the invention, Haruna discloses that a specified benzotriazole compound is dissolved or uniformly dispersed in a synthetic composition with the consequence of causing them to be very resistant to oxidative deterioration and the accelerative action of heavy metals present therein (column 2, lines 11-15).

(3) Comparison of the present invention and the cited references

One of the significant features of the present invention resides in a specific combination of a polyacetal, a specific aliphatic carboxylic acid hydrazide, an antioxidant, a specific heat stabilizer and a specific processing stabilizer.

The cited references fail to disclose or suggest such a specific combination of components.

EP 0333660 discloses some carboxylic hydrazides and Haruna discloses special benzotriazole compounds having a group -C(=O)NHNHC(=O)- as a stabilizer. However, these compounds are clearly different in structure from the specific hydrazide used in the present invention. In more detail, the moiety to which the hydrazino group is bonded of EP 0333660 does not contain a hetero atom or a hetero atom-containing group. Moreover, the benzotriazole compounds of Haruna do not have a free hydrazino group (-C(=O)NHNH₂).

Further, according to EP 0333660, a hindered phenol, a phosphite, melamine, calcium citrate, an alkaline earth metal salt of a higher fatty acid and the like are disclosed as some examples among various additives. Similarly, Haruna describes an antioxidant, a light stabilizer, a heat stabilizer, and other additives, as optional components. In particular, Haruna describes a polyacetal as only one example at the same level or rank as other numerous polymers. Thus, it is quite difficult to selectively combine a polyacetal resin, the specific hydrazide, and the specific antioxidant, heat stabilizer and processing stabilizer since even selecting these components from various additives and polymers is difficult.

As apparent from these disclosures by the cited references, the cited references are silent on not only the specific hydrazide compound but also the combination of such a hydrazide compound, a polyacetal resin, a specific antioxidant, a processing stabilizer and a heat stabilizer.

Therefore, the present invention would never be predicted from the cited references.

Further, the present invention also shows unexpected results. That is, since the cited references use conventional hydrazide compounds, mold deposit and bleed out would not be sufficiently suppressed. Further, the cited references only exemplify, as an optional component, an antioxidant, a heat stabilizer or the like, a relationship

between (a1) improvements in the mold deposit and bleed out properties and (a2) suppression in formaldehyde emission would not provide motivation from the cited references in connection with a polyacetal and/or some additives exemplified by the references.

In contrast, according to the present invention, the mold deposit and bleed out of additives and the like from the composition are remarkably suppressed under both dry and humid conditions while effectively inhibiting formaldehyde emission even using a polyacetal base resin, due to the above specific hydrazide compound and the above specific combination, thereby improving moldability or molding efficiency.

It will be especially noted in this regard, as apparent from a comparison of Example 1 with other Examples in Table 1 of the specification, that the composition of the Example 1 which does not comprise an antioxidant, a heat stabilizer and a processing stabilizer in combination shows formaldehyde emission inhibition to a certain degree. However, the mold deposit and bleed out of the above composition is not sufficiently inhibited relative to other Examples. On the other hand, other Examples (i.e., Examples 2-15) show results that mold deposit and bleed out are suppressed and compatible with inhibition of formaldehyde emission, even though the contents of the hydrazide are smaller than that of the Example 1.

Thus, such unexpected results of the present invention would never be predicted from the cited references.

Withdrawal of the rejection advanced under 35 USC §103(a) is therefore in order.

10. Fee Authorization

The Commissioner is hereby authorized to charge any deficiency, or credit any overpayment, in the fee(s) filed, or asserted to be filed, or which should have been filed

HARASHINA
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herewith (or with any paper hereafter filed in this application by this firm) to our Account No. 14-1140.

Respectfully submitted,

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